

# SLEEP & HEART DISEASE



The connection  
between sleep,  
sleep disorders,  
and heart  
disease.

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a wellness booklet from  
American Academy  
of Sleep Medicine



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## ear Reader:

Sleep isn't just "time out" from daily life. It is an active state important for renewing our mental and physical health each day. More than 100 million

Americans of all ages, however, regularly fail to get a good night's sleep.

At least 84 disorders of sleeping and waking lead to a lowered quality of life and reduced personal health. They endanger public safety by contributing to traffic and industrial accidents. These disorders can lead to problems falling asleep and staying asleep, difficulties staying awake or staying with a regular sleep/wake cycle, sleepwalking, bedwetting, nightmares, and other problems that interfere with sleep. Some sleep disorders can be life-threatening.

Sleep disorders are diagnosed and treated by many different healthcare professionals, including general practitioners and specialists in neurology, pulmonary medicine, psychiatry, psychology, pediatrics, and other fields. As part of its mission, the American Academy of Sleep Medicine (AASM) strives to increase awareness of sleep disorders in public and professional communities. The AASM is the major national organization in the field of sleep medicine. We represent several thousand clinicians and researchers in sleep disorders medicine.

For more information about sleep disorders, contact your healthcare professional. For a list of accredited member sleep disorders centers near you, write to us or visit our web site.

Sincerely,

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## Introduction

Sleep is a time of rest for the entire body. Even the heart, which works day and night, naturally slows down during sleep. That's why unhealthy heart function (caused by conditions such as heart disease) can deprive the body of restful sleep. Yet, the relationship between heart function and sleep works both ways. For instance, sleep-related breathing disorders have been shown to play a major role in causing several types of heart and blood vessel disease.

## Sleep and the Heart

**"Even the heart, which works day and night, naturally slows down during sleep."**

There are two distinct types of sleep: rapid-eye-movement (REM) sleep (when most dreaming occurs), and non-REM sleep. Typically, when you fall asleep you begin in non-REM sleep and spend about 80% of the night in this type of sleep. During non-REM sleep your heart rate, breathing, and blood pressure all drop to levels below those occurring while you're awake. During REM sleep-approximately 20% of your time asleep-both your blood pressure and heart rate can fluctuate. Any time you wake up from sleep (even briefly), your heart rate and blood pressure climb, and your heart must work

harder. When you wake up in the morning, your blood pressure and heart rate both go up and then stay at a higher level throughout the day.

## Sleep and Heart Disease

Although all aspects of the relationship are not clear, there is definitely a direct connection among sleep, sleep disorders, and heart disease. Medical professionals have already identified an increased risk of sudden cardiac death in the first several hours after awakening, perhaps due to the increased work demand on the heart that occurs with awakening. Various studies also have clearly linked sleep-related breathing disorders with increased rates of high blood pressure and increased risk of heart disease and stroke. In fact, treating certain sleep-related breathing disorders may actually decrease a person's chances of developing certain cardiovascular diseases.

### Hypertension (High Blood Pressure)

Several studies have shown a link between hypertension and the presence of a disorder of abnormal breathing during sleep called obstructive sleep apnea (OSA). Not only is hypertension common in those with OSA, but evidence suggests that OSA can lead directly to the development of hypertension. People with OSA have repeated interruptions in breathing during sleep, caused by the main breathing passage in the back of the throat closing or becoming too narrow. Every time this passage is blocked, breathing stops and oxygen is used up. After awhile (usually 10-20 seconds, although up to one minute is not unusual) the breathing difficulty causes a brief awakening, often so short that the person is unaware of any interruption in sleep. The awakening relieves the blockage in the breathing passage and normal breathing resumes, at least until the person falls back asleep, when the entire process can repeat (often hundreds of times per night). The drop in oxygen level from not breathing, and the increase in heart rate and blood pressure caused by waking up, put stress on the heart. These nightly increases in blood pressure eventually lead to permanent increases in blood pressure, even during the day.

It is important to treat hypertension since it is a known risk factor for the development of other forms of cardiovascular disease such as heart attack, heart failure, and stroke. But treating hypertension may not be enough if the key reason for a person's high blood pressure is an unrecognized sleep disorder like OSA. Hypertension medications, for instance, may not work well if OSA remains untreated. Many people who have difficult cases of hypertension are later found to have untreated OSA and treatment of the OSA can improve hypertension. For this reason, it is important for your health-care professional to investigate all of the possible causes of your hypertension, including sleep disorders like OSA.

### Coronary Artery Disease

There is a direct association between sleep-related breathing disorders and cardiovascular disease. People with OSA, for example, have been shown to have higher rates of coronary artery disease (CAD). There are several reasons why this may occur: 1) OSA increases the risk for hypertension, which is a known cause of CAD; and 2) the events occurring during OSA can put excessive stress on the heart and worsen existing disease. In people with CAD, the flow of blood, which carries oxygen to the heart, is limited (due to narrowed arteries). So, if they experience OSA, their blood oxygen levels drop and their heart rate and blood pressure rise, increasing the work required of their heart. As a result, the amount of oxygen supplied to their heart decreases just as their heart is demanding more oxygen. Several research studies have shown changes indicating ischemia, or lack of blood flow, on electrocardiogram during apneas in people with CAD. In people who have had heart attacks, OSA is more likely to occur and may negatively affect their recovery. Studies have shown that the presence of OSA increases the risk of death from CAD. However, if recognized, treatment of OSA reduces death due to CAD.

### Congestive Heart Failure

Congestive heart failure occurs when the heart is damaged so much that it is unable to pump blood effectively. Disorders of sleep and breathing can both cause heart failure and develop as a result of heart failure. Studies have shown that OSA is a significant risk factor for the development of

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congestive heart failure. In addition, people who have heart failure from another condition, such as coronary artery disease or hypertension, risk worsening their congestive heart failure if they develop OSA. The heart muscle, already in a weakened state, is unable to handle the additional stress caused by the OSA. However, treating OSA can improve heart function in patients with congestive heart failure.

About 40% of people with congestive heart failure also have a sleep-related breathing disorder called central sleep apnea (CSA). In CSA there are repetitive episodes of interruptions in breathing during sleep, just like in OSA. However, in CSA the breathing passage remains open but the person stops making efforts to breathe. Frequent awakenings and drops in the level of oxygen in the blood also occur in CSA. The awakenings increase heart rate and blood pressure, which can worsen heart failure, in turn leading to more CSA and causing a vicious cycle that decreases heart function. The first approach to treating CSA is to prevent it by treating the heart failure as thoroughly as possible. If CSA is still present, treatments are available to correct the CSA. Treatment of CSA can improve heart function as well as improve sleep quality.

## Stroke

During a stroke the brain is damaged when the supply of blood and oxygen is reduced or cut off. Hypertension is the most common cause of stroke, and, as stated above, OSA can lead to the development of hypertension. In addition, OSA may cause strokes directly since blood flow to the brain is reduced and the level of oxygen drops during apneas.

Abnormal breathing patterns during sleep, especially OSA, are also more common immediately following a stroke. And, other effects of OSA, such as excessive sleepiness from disrupted sleep and impaired thinking, may hamper a person's recovery from a stroke.

## Effects of Heart Disease on Sleep

As outlined above, sleep-related breathing disorders can directly cause heart disease. Yet, there are effects of heart disease on sleep that, though more subtle, are also important to address. For instance, patients with congestive heart failure often report difficulty falling asleep or staying asleep because of the shortness of breath that often accompanies heart failure. This shortness of breath is often worse when the patient lies down because blood in the legs flows back into the heart and can overwhelm its ability to pump. Doctors call these symptoms orthopnea (shortness of breath when lying down) and paroxysmal nocturnal dyspnea (waking up from sleep short of breath). The patients who experience these symptoms may feel like they have insomnia since their sleep is interrupted. In addition to experiencing these complications from heart disease, patients often worry about the long-term consequences of a heart attack or chronic heart disease. Such anxiety, by itself, can lead to the development of chronic insomnia. Taking into consideration all of these plus the direct relationship of numerous heart conditions with sleep-related breathing disorders, it is clear that people with heart conditions need to take special care and seek medical attention in order to ensure their ability to sleep well.

## Good Sleep-Healthy Heart

Many things can be done to maintain a healthy heart: eat a



nutritional diet, maintain a healthy weight, exercise regularly, get regular medical check-ups, and get adequate amounts of good quality sleep. If you have any kind of heart condition, it is especially important to watch for signs that you may have a sleep-related breathing disorder, such as OSA, which could stress your heart. People with OSA are often overweight and experience loud snoring, gasping, or choking episodes while sleeping, as well as trouble staying awake during the daytime. If you already have hypertension or cardiovascular disease (coronary artery disease, angina pectoris, stroke), talk with your healthcare professional about whether or not you may have a sleep and breathing disorder, such as OSA or CSA. It is also important that patients with congestive heart failure be monitored for CSA and other sleep disorders. In contrast to people with OSA, those with heart failure and CSA are commonly thin and may not snore at all.

If your healthcare professional thinks that you have a sleep disorder, he or she may suggest that you have a diagnostic test, called a sleep study, or refer you to a sleep medicine specialist. Sleep studies are usually done in a sleep laboratory. Small sensors called electrodes are attached to your body to measure your sleep, breathing, heart rate, and oxygen level. The sleep specialist will be able to determine whether you have any abnormalities in the quality of your sleep. Your healthcare professional is then given the results and the two of you can decide on the best course of treatment. Sleep disorders are treatable, and treatment can lead to a more healthy heart.

## Good Sleep Habits

These guidelines can be used for a variety of sleep disorders. They will help most people sleep better. For more specific guidelines for your particular sleep disorder, consult your healthcare professional.

- ◆ Maintain a regular wake time, even on days off work and on weekends.
- ◆ Try to go to bed only when you are drowsy.



“Keep a  
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- ◆ If you are not drowsy and are unable to fall asleep for about 20 minutes, leave your bedroom and engage in a quiet activity elsewhere. Do not permit yourself to fall asleep outside the bedroom. Return to bed when, and only when, you are sleepy. Repeat this process as often as necessary throughout the night.
- ◆ Use your bedroom only for sleep, sex and times of illness.
- ◆ Avoid napping during the daytime. If you nap, try to do so at the same time every day and for no more than one hour. Mid-afternoon (no later than 3:00pm) is best for most people.
- ◆ Establish relaxing pre-sleep rituals such as a warm bath, light bedtime snack, or ten minutes of reading.
- ◆ Exercise regularly. Confine vigorous exercise to early hours, at least six hours before bedtime, and do mild exercise at least four hours prior to bedtime.
- ◆ Keep a regular schedule. Regular times for meals, medications, chores, and other activities help keep the inner clock running smoothly.

- ◆ While a light snack before bedtime can help promote sound sleep, avoid large meals.
- ◆ Avoid ingestion of caffeine within six hours of bedtime.
- ◆ Don't drink alcohol when sleepy. Even a small dose of alcohol can have a potent effect when combined with tiredness.
- ◆ Avoid the use of nicotine close to bedtime or during the night.
- ◆ Sleeping pills should be used only conservatively. Most doctors avoid prescribing sleeping pills for periods longer than three weeks.
- ◆ Do not drink alcohol while taking sleeping pills or other medications.

## Heart Conditions Associated With Sleep-related Breathing Disorders

- ◆ Hypertension
- ◆ Coronary Artery Disease
- ◆ Congestive Heart Failure
- ◆ Stroke

## Symptoms of Obstructive Sleep Apnea

- ◆ Loud snoring
- ◆ Gasping or choking episodes while sleeping
- ◆ Witnessed episodes of stopped breathing while asleep
- ◆ Excessive sleepiness
  - Falling asleep at inappropriate times
  - Driving or workplace accidents
- ◆ Trouble concentrating, irritability, depression
- ◆ Morning headaches

## Symptoms of Central Sleep Apnea

- ◆ Symptoms of congestive heart failure
  - Shortness of breath
  - Difficulty breathing while lying flat
- ◆ Restless sleep
- ◆ Waking up gasping or short of breath
- ◆ Witnessed episodes of stopped breathing while sleeping
- ◆ Unrefreshing sleep
- ◆ Snoring may be absent

## Wellness booklets available through the American Academy of Sleep Medicine



Circadian Rhythms  
 Coping with Shift Work  
 Drowsy Driving  
 Insomnia  
 "My Child Can't Sleep"  
 "My Child Snores"  
 Narcolepsy  
 Obstructive Sleep Apnea and Snoring  
 Overnight Sleep Studies  
 Parasomnias  
 Positive Airway Pressure Therapy for Sleep Apnea  
 Restless Legs Syndrome and Periodic Limb Movement Disorder  
 Sleep and Depression  
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 Sleep and Heart Disease  
 Sleep as We Grow Older  
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 Sleep Hygiene  
 Sleep in Women  
 Sleepwalking and Other Childhood Parasomnias  
 Teenagers, Young Adults & Sleep  
 Treatment Options for Obstructive Sleep Apnea Syndrome

The American Academy of Sleep Medicine (AASM) is proud to provide these wellness booklets about sleep habits and sleep disorders to the public.

Please send one business-size self-addressed stamped envelope *per booklet* to the AASM, along with a request specifying which booklet you would like to receive.

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Most wellness booklets include reading lists for additional information.